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BULLETIN
OF THE
TORREY BOTANICAL CLUB

NOVEMBER, 1915

Notes on *Carex*—IX

KENNETH KENT MACKENZIE

CAREX STRAMINEA WILLD. AND SOME OF ITS NEAREST ALLIES

The original description of *Carex straminea* Willd. (Schkuhr, Riedgr. 49. 1801) reads as follows: "C. spiculis ovatis distantibus, capsulis obovatis acuminatis, margine hispidis." The accompanying figure (*f.* 34) illustrates a plant with a strongly obovate perigynium body abruptly contracted into a beak much less than half the length of the body. The identity of the species was for many years obscured owing to the fact that Schkuhr later (Riedgr. Nachtr. *f.* 174. 1806) gave another illustration of a plant which he took for *Carex straminea* Willd. Unfortunately he illustrated a related but distinct species (*Carex straminea* var. *brevior* Dewey), and further changed the description (*l. c.* 23) to correspond with the plant so illustrated.

Professor Bailey (Mem. Torrey Club 1: 21-22. 1889) pointed out this error, and at the same time identified *Carex straminea* Willd. with a slender weak plant which had been distributed as *Carex tenera* Dewey by Sartwell and by Olney. In this identification he was followed by Professor Fernald (Proc. Am. Acad. 37: 450. 1902), who later also pointed out that the plant distributed by Sartwell and by Olney was in fact the real *Carex tenera* Dewey (Rhodora 8: 165. 1906). The fact that this plant has an ovate perigynium body, and the genuine *Carex straminea* Willd. an obovate perigynium body was not pointed out. Field work and a steady accumulation of specimens has served to emphasize the differences between these

[The BULLETIN for October (42: 549-602) was issued November 13, 1915.]

two plants, and to justify Dewey in having proposed *Carex tenera* as a distinct species.

The real *Carex straminea* is a tall slender but rather stiff plant of wet soil with stiff, little flexuous inflorescence; the lower nodes are exposed, and the sheaths are green-striate ventrally nearly to the apex, the hyaline portion being short. The body of the perigynium is strongly obovate and abruptly contracted into a short beak less than half the length of the body; it is thin except where distended by the achenes, and is strongly but finely five- to seven-nerved ventrally over the stipitate achene. The scales are not brownish tinged, but are hyaline with a conspicuous green strip on each side of the midvein.

On the other hand, *Carex tenera* Dewey is usually a very slender plant of dry soil with slender, flexuous inflorescence; the lower nodes are not exposed and the sheaths are conspicuously hyaline ventrally. The thick ovate perigynium tapers into the short beak, and is less strongly three- to five-nerved ventrally over the sub-stipitate achene. The scales are reddish brown tinged and lack the conspicuous green strip on each side of the midvein.

After separating these two plants a third element still remained in the aggregate which had been referred to *Carex straminea*. This has the nodes and sheaths as in *Carex tenera*. The leaves, however, are wider, and the plant is much less slender. The inflorescence consists of from four to nine spikes, which are normally strongly clavate at the base and not rounded as in the other two species. The body of the perigynium is suborbicular or orbicular and contracted into a beak half the length of the body, which is thick and but faintly three- to five-nerved ventrally. The scales are more or less strongly reddish-brown tinged. This plant is an exact match for *Carex festuacea* Schkuhr (Riedgr. Nachtr. 23. f. 173. 1806), and should take that name.

The plant which has of late years been treated as *Carex festuacea* and as *Carex festuacea* var. *brevior* (Dewey) Fernald commonly has three to six little separated spikes rounded at the base, but occasionally has more numerous and more separated spikes which are then apt to be more staminate and hence more clavate at the base. It is well distinguished from the species above described by the perigynium exceeding 4 mm. in length, while the

beak is much less than half as long as the body. The suborbicular achenes are twice as large as the broadly oval achenes of genuine *Carex festucacea*. This plant should be known as **Carex brevior** (Dewey) Mackenzie,* comb. nov.

Detailed descriptions of each of these three species and lists of the specimens examined follow.

CAREX STRAMINEA Willd.; Schk. Riedgr. 49. *pl. G, f. 34.* 1801

Densely caespitose, the culms slender, 2.5–9 dm. high, exceeding leaves, sharply triangular and roughened on the angles immediately beneath the head, the lower leaves much reduced. Leaves with well-developed blades three to five to a fertile culm, on the lower third but much separated, the blades flat, erect-ascending, attenuate, 2–3 mm. wide, usually 5–15 cm. long, the margins rough; the sheaths loose, green-striate ventrally nearly to apex; sterile culm leaves more numerous. Spikes three to ten, aggregated, approximate or more or less separate in a stiff head 2.5–6 cm. long, the spikes 6–10 mm. long, 4.5–6 mm. wide, ovoid, rounded at apex, the terminal long clavate and staminate at base, the lateral rounded or short clavate and sparingly staminate at base with fifteen to thirty appressed-ascending perigynia with erect or ascending or somewhat spreading beaks; bracts scale-like or the lowest often cuspidate-prolonged, 5–20 mm. long. Scales ovate, acute or short acuminate, white-hyaline with green strip on each side of mid-vein slightly light brownish tinged, narrower and shorter than perigynia. Perigynia green or greenish, the body obovate, thin except where distended by achene, wing-margined to base, 1.5–2 mm. broad, 3.5 mm. long, many-nerved on outer face, lightly about five-nerved on inner face over achene, with an additional nerve in either margin, rounded at base, abruptly contracted into a beak half the length of body, the beak obliquely cut dorsally, flat and strongly serrulate, as is upper third of perigynium body. Achenes lenticular, brownish, oval-oblong, sub-stipitate, 1.5 mm. long, 0.75 mm. wide, slightly apiculate, and continuous with slender flexuous style; stigmas two.

The more strongly developed specimens of this species bear a strong resemblance to *Carex alata* Torr. They are to be distinguished by the smaller perigynia which are more strongly nerved ventrally and only obliquely cut at the apex, as also by the less strongly stipitate achenes.

Carex straminea* var. *brevior* Dewey, Am. Journ. Sci. **11: 158. 1826.

SPECIMENS EXAMINED

NEW YORK: Yonkers, *Bicknell*, June 16, 1895 (C.); Lowerre, *Bicknell*, July 4, 1891, June 9, 1895 (C.); "New York," *Torrey* (C.).

NEW JERSEY: Mickleton, *Crawford*, May 10, 1892 (P.); Trenton, *Brown*, May 29, 1904 (P.); Riddleton, Salem County, *MacElwee*, June 15, 1895 (P.); Eagle Rock, Essex County, *Mackenzie* 1445, July 4, 1905 (K. M.).

PENNSYLVANIA: Tannersville, *Brown*, July 4, 1896 (P.); Ex Herb. *Schweinitz* (P.); West Philadelphia, *MacElwee*, June 14, 1894 (P.); Point Pleasant, *Fretz*, June 22, 1898 (P.); Jordan Valley, Lehigh County, *Pretz* 6800, 6809, July 4, 1914 (P.); Diamond Rock, Chester County, *Bartram* 1532, June 18, 1911 (P.); Pricetown, Bucks County, *Britton*, July, 1915 (N. Y.).

DELAWARE: Vandyke, Newcastle County, *Long*, July 3, 1909 (P.); Newcastle County, *Commons*, June, 1872 (P.).

MARYLAND: Hyattsville, *Steele*, June 7, 1903 (K. M.).

DISTRICT OF COLUMBIA: Washington, *Steele*, June 5, 1902 (K. M.); Washington, *Kearney*, June 6, 1897 (N. Y.).

INDIANA: Patoka, Gibson County, *Deam* 13318, June 9, 1913 (K. M.).

ILLINOIS: Cobden, *Earle* 730, May 23, 1912 (N. Y.).

MISSOURI: Atherton, *Bush* 6800, June 7, 1912 (N. Y.); Greenwood, *Bush* 6707A, May 20, 1912 (N. Y.).

TENNESSEE: Henderson, *Bain* 501, May 13, 1893 (C.).

GEORGIA: Milledgeville, *Boykin* (C.); Burke County, *Harper* 797, June 5, 1901 (N. Y.).

FLORIDA: *Chapman* (C.); Jacksonville, *Curtiss* 4743, May 3, 1894 (C.).

LOUISIANA: *Hale*, 1845 (C.); *Leavenworth*, 1845 (C.).

CAREX TENERA Dewey, Am. Journ. Sci. 8: 97. 1824

(also 9: *pl. c, f. g.* 1825)

Carex festucea var. *tenera* Carey; A. Gray, Man. 545. 1848.
Carex straminea var. *tenera* Boott, Ill. Car. 3: 120, *pl.* 384. 1862.
Carex tenera forma *erecta* Olney; Kükenthal, Engler's Pflanzenreich 4²⁰: 205. 1909 (as synonym).

Densely cespitose, the culms slender, erect, 3-7.5 dm. high, sharply triangular and roughened on angles above, much ex-

ceeding leaves, dark at base, the lower leaves reduced, the lower nodes not exposed. Leaves with well-developed blades three to five to a fertile culm, on lower third but not bunched, the blades flat, 1.5–2.5 mm. wide, usually 7.5–30 cm. long, the sheaths tight, but obscurely septate-nodulose, conspicuously hyaline ventrally and prolonged upward. Inflorescence of four to eight spikes in a more or less strongly moniliform head 2.5–5 cm. long, the spikes ovoid, gynaeandrous, rounded at apex, 6–10 mm. long, 4.5–6 mm. wide, with ten to twenty appressed perigynia above, the tips appressed, rounded and with few staminate flowers at base (except in terminal spike); lowest bract short, setaceous, the upper scale-like. Scales ovate, acute, hyaline with green midvein, and tawny tinged, narrower and shorter than perigynia. Perigynia green or in age straw-colored, ovate, 3.5 mm. long, nearly 2 mm. wide, the body suborbicular, thickish, plano-convex, winged to base, strongly about five-nerved dorsally over achene with an additional nerve in both margins and similarly but less strongly nerved ventrally, rounded and sessile at base, contracted into beak half length of body, the beak tawny tipped, obliquely cut dorsally, flat and strongly serrulate, as is upper half of perigynium body. Achenes broadly ovoid, plano-convex, light brown, substipitate, 1.25 mm. long, 1 mm. wide, apiculate, the style slender, straight. Stigmas two.

SPECIMENS EXAMINED

MAINE: Pittsfield, *Knight*, June 18, 1905 (K. M.); Mt. Hope, *Knight*, July 1, 1906 (K. M.); Orono, *Knight*, July 15, 1904 (K. M.).

MASSACHUSETTS: Middlefield, Hampshire County, *Fernald & Long 8991, 8992*, June 26, 1913 (P.); North Adams, Berkshire County, *Fernald & Long 8990*, June 25, 1913 (P.); "Massachusetts, *Dewey*" (P.).

NEW YORK: Dundee, Yates County, *Wright* (K. M.); Lansingburgh, *Howe*, June, 1891 (N. Y.); Oneida County (C.).

NEW JERSEY: Netcong, Morris County, *Mackenzie 2078*, June 10, 1906 (K. M.).

PENNSYLVANIA: Ft. Washington, Montgomery County, *Long*, June 16, 1908 (P.).

DELAWARE: Vandyke, *Long 1742*, May 24, 1909 (P., K. M.).

MICHIGAN: Emerson, Chippewa County, *Dodge*, Sept. 5, 1914 (K. M.); Imlay City, Lapeer County, *Dodge*, June 11, 1911 (K. M.); Port Huron, *Dodge*, May 14, 1896 and May 28, 1896 (K. M.).

INDIANA: Bushrod, *Deam 10712*, May 26, 1912 (K. M.).

ILLINOIS: Fountaindale, Winnebago County, *Bebb* (P., K. M.).

SOUTH DAKOTA: Jones Island, *Williams* 1876, August 15, 1894 (K. M.).

NORTH DAKOTA: Butte, Benson County, *Lunell*, July 26, 1914 (K. M.); Lake Ibsen, Benson County, *Lunell*, July 4, 1914 (K. M.); Towner, McHenry County, *Lunell*, July 21, 1908, Sept. 10, 1908, June 12, 1913 (K. M.); Leeds, Benson County, *Lunell*, June 2, 1901 (K. M.).

NEW MEXICO: Brazos Canyon, Rio Arriba County, *Standley & Bollman* 11036, Sept. 1, 1914 (K. M.).

CAREX FESTUCACEA Schk.; Willd. Sp. Pl. 4: 242. 1805

Carex straminea var. *festucea* Tuckerm. Enum. Meth. 18. 1843.

Densely caespitose, the culms slender but rather stiff, erect, 5-9 dm. high, sharply triangular and roughened on angles above, much exceeding leaves, the lower leaves reduced, the lower nodes not exposed. Leaves with well-developed blades three to five to a fertile culm, on lower third of culm, but not bunched, the blades flat, 1.5-2.5 mm. wide, usually 7.5-30 cm. long, the sheaths tight, sparingly septate-nodulose, conspicuously hyaline ventrally and prolonged upward. Inflorescence of four to ten spikes, in a moniliform head 2.5-6 cm. long, the spikes gynaeandrous, rounded at apex, 6-16 mm. long, 5-6 mm. wide, with ten to twenty appressed-ascending perigynia above with rather conspicuous tips, usually strongly clavate with numerous staminate flowers at base; lowest bract occasionally somewhat developed, the others scale-like. Scales ovate, acute, hyaline with green midvein, and tawny tinged, narrower and shorter than perigynia. Perigynia green or in age straw-colored, 3.5 mm. long, 2 mm. wide, the body orbicular, thick, plano-convex, winged to base, strongly about five-nerved dorsally over achene with an additional nerve in both margins, and similarly but less strongly nerved ventrally, rounded and sessile at base, abruptly contracted into a beak nearly length of body, the beak tawny-tipped, obliquely cut dorsally, flat and strongly serrulate as is upper half of perigynium body. Achenes oblong-ovoid, plano-convex, light-brown, short-stipitate, 1.5 mm. long, nearly 1 mm. wide, apiculate, the style slender, straight. Stigmas two.

SPECIMENS EXAMINED

MASSACHUSETTS: "Massachusetts," *B. D. Greene* (C.).

NEW YORK: Penn Yan, *Sartwell* (N. Y.).

NEW JERSEY: Farmingdale, Monmouth County, *Long &*

Brown 3601, May 28, 1910 (P., K. M.); Summit, Union County, *Mackenzie 159*, May 30, 1903 (K. M.); Monmouth Junction, *Mackenzie 4964, 4970*, May 26, 1912 (K. M.); Mt. Arlington, Morris County, *Mackenzie 1422*, June 25, 1905 (K. M.); Stirlington, Morris County, *Mackenzie 1268*, May 28, 1905 (K. M.).

PENNSYLVANIA: Valley Forge, Chester County, *Long*, June 24, 1909 (P.); Ryers, Philadelphia County, *Long*, June 15, 1909 (P.); Radnor Township, Delaware County, *Bartram*, June 10, 1907 (P.); Sellersville, *Crawford*, June 11, 1899 (P.); Byberry, *Martindale* (P.); Lanark, Lehigh County, *Pretz 4474*, June 1, 1912 (P.); Mountainville, Lehigh County, *Pretz 413*, June 15, 1907 (P.); Fern Rock, Philadelphia County, *Long*, June 13, 1908 (P.); Penllyn, Montgomery County, *Long 1703*, June 12, 1909 (P., K. M.); Corning, Lehigh County, *Pretz 3379*, May 21, 1911 (P.); New Garden, Chester County, *Pennell 4999*, June 12, 1913 (P.); Glen Riddle, Delaware County, *Pennell 3801*, June 23, 1912 (P.); Willow Grove, *Saunders*, June 4, 1898 (P.); Nottingham, Chester County, *Pennell & Long 7486*, June 22, 1912 (P., K. M.); "Pennsylvania," *Collins* (C.).

DELAWARE: Mt. Cuba, *Commons*, June 23, 1874 (P.); Faulkland, *Commons*, June 10, 1892 (P.).

MARYLAND: Beltsville, *Steele*, May 30, 1903 (K. M.).

NORTH CAROLINA: Salem, *Schweinitz* (P.).

TENNESSEE: Henderson, *Bain 10999*, May, 1893 (K. M.).

INDIANA: Hovey Lake, Posey County, *Deam 8303*, May 23, 1911 (K. M.); Bicknell, *Deam 11060*, June 7, 1912 (K. M.).

MISSOURI: Sheffield, *Bush 3904*, June 2, 1906 (K. M.); Sibley, *Mackenzie 88*, May 30, 1898 (K. M.); Independence, *Mackenzie*, May 23, 1897 (K. M.); Butler County, *Bush 2545*, May 1, 1905 (K. M.); Lake City, *Bush 6835*, June 20, 1912 (K. M.); Atherton, *Bush 6800*, June 7, 1912 (K. M.); Greenwood, *Bush 6707A*, May 20, 1912 (K. M.).

ARKANSAS: Texarkana, *Bush 2501*, April 28, 1905 (K. M.).

MISCELLANEOUS NEW SPECIES OF CAREX

Carex festivella sp. nov.

Cespitose from short-creeping tough matted blackish fibrillose root-stocks, the culms stout at base, slender but stiffish above,

3-6 dm. high, triangular and somewhat roughened beneath head, conspicuously striate, exceeding leaves, aphyllopodic, light brown at base, mostly developing and flowering same year. Leaves with well-developed blades three to five to a fertile culm, on lower fourth, but not bunched, the blades erect, 2-4 mm. wide, mostly 1-2 dm. long, flat, the sheaths tight, hyaline ventrally, concave at orifice. Sterile shoots similar. Head ovoid or oblong-ovoid, 12-25 mm. long, 10-18 mm. wide, with five to ten densely aggregated but distinct gynaeandrous spikes, the latter oblong-ovoid, 5-12 mm. long, 4-8 mm. wide, rounded or round tapering at base and round tapering at apex, the perigynia fifteen to thirty, densely arranged in many rows, appressed with erect ascending tips. Lowest bract somewhat prolonged, shorter than head, the others scale-like. Scales ovate, obtuse or acutish, dark chestnut to brownish-black with lighter poorly defined midvein and narrow hyaline margins, narrower and shorter than perigynia. Perigynia ovate, 3.75-5 mm. long, 1.5-2 mm. wide, thin, save where distended by achene, the walls membranaceous, light green or stramineous, the beak strongly dark-tinged, lightly several-nerved on both faces, rounded at base, strongly thin-margined, tapering into a beak half the length of body, serrulate to middle, the beak hyaline-tipped, obliquely cut ventrally. Achenes lenticular, obovoid, substipitate, 1.5 mm. long, 1 mm. wide, apiculate, the slender style tardily deciduous. Stigmas two.

The type specimens of *Carex festiva* Dewey were collected by Richardson "at Bear Lake and on the Rocky Mountains." These specimens or duplicates thereof marked as collected at Bear Lake are in the Torrey herbarium at the New York Botanical Garden, and represent a widely distributed boreal species known from the far northern regions of Canada, from Labrador, from Greenland and from various far northern points in Europe. Specimens which I cannot distinguish also come from the extreme southern part of South America, and associated with them is the name *Carex macloviana* D'Urv. This name has about ten years priority over *Carex festiva* Dewey, and accordingly must be used for the boreal plant under discussion.

This boreal plant is one representative of a series of closely related species, many of which are found in the higher mountains of the western part of North America. Taking these species together the tendency is rather strongly toward the development of a more congested inflorescence than is found in *Carex straminea*

and its numerous allies, so widely distributed especially in the eastern part of North America. This, however, is only a tendency, as a number of species of the *C. festiva* group, especially from California, have an elongated inflorescence; while on the other hand a number of species of the *C. straminea* group have a congested inflorescence.

Probably the best character to use to separate the two groups is that in the *C. festiva* group the beak of the perigynium towards the apex is slender and almost terete, and the margin for the last one or two millimeters is smooth or very sparingly serrulate. On the other hand in the *C. straminea* group the beak of the perigynium is flat and serrulate-margined to the tip.

For many years the name "*Carex festiva* Dewey" has been applied to specimens from the western mountains, and a plant especially common in Colorado and Wyoming has been taken to be the typical form. In this plant, which is the *C. festivella* of the present paper, the perigynium tapers into a dark slender beak half the length of the much lighter colored body and contrasting strongly with it in color. In the genuine boreal plant both body and beak are reddish tinged and the beak is only one fourth or one fifth the length of the body. In both species the extreme tip of the perigynium is hyaline. The Rocky Mountain plant is striate-nerved on the inner face; the boreal plant is essentially nerveless.

In addition to those characters taken from the perigynium it may be added that the boreal plant has reddish scales and the Rocky Mountain plant dark colored scales.

In the boreal plant the fertile culms develop several leaves the first year, and at flowering time in the second year these remain in a more or less dried-up condition at the base of the culms. As a result of this manner of growth there are always present numerous well-developed flowerless culms in a clump consisting of the first year fertile shoots and the more leafy sterile shoots.

In the Rocky Mountain plant the fertile culms normally develop all their leaves and flower during one year, and in consequence there are no old dried-up well-developed leaves towards the base of the flowering culms. At flowering time the shoots for the next year are very evident, but have no developed leaves. As

a result at flowering time the flowerless culms are few in number, consisting only of the sterile shoots. While this difference in manner of growth is very characteristic one must bear in mind that any unusual spell of warm weather towards the end of a season is apt to start into premature growth a shoot ready for quick development the next year. When this happens the result is the same biennial method of growth as in the boreal plant. While this is not of very frequent occurrence, it makes the use of this difference in habit of growth hardly useful as a key character.

For the group the Rocky Mountain plant under discussion usually has stout culms and broad leaf-blades and presents a very green general appearance. The closely allied *Carex microptera* Mackenzie has narrower perigynia which are very narrowly margined at base and have more spreading beaks giving the head an echinate appearance lacking in the present species.

Aven Nelson's No. 3275, collected July 2, 1897, in Albany County, Wyoming, and in my herbarium, may be taken as the type of *C. festivella*. A duplicate is in the New York Botanical Garden herbarium. The species ranges from the Cypress Hills in Saskatchewan and the Black Hills in North Dakota west to eastern British Columbia and southward through the Rocky Mountain region to Chihuahua, its best development being apparently in Colorado and Wyoming where it is one of the most characteristic mountain species.

SPECIMENS EXAMINED

CANADA: Between Keith and Columbia Rivers, *J. Macoun* 63304, July 8, 1902 (N. Y.); Banff, *J. Macoun*, July 12, 1891 (C.); Cypress Hills, Assiniboia, *J. Macoun* 7397, June 25, 1894 (C.); above Carbonate, *Petersen* 225, July 9, 1904 (N. Y.).

SOUTH DAKOTA: Rochford, Black Hills, *Rydberg* 1087, July 12, 1892 (N. Y.); Custer County, *Over* 1768, June 20, 1914 (K. M.).

MONTANA: Bozeman, *Rydberg* 3002, July 7, 1896 (N. Y.); Little Belt Mountains, *Flodman* 305, August 10, 1896 (N. Y.); Jocko Creek, *MacDougal* 280, June 16, 1911 (N. Y.); MacDougal's Peak, *MacDougal* 601, July 10, 1901 (N. Y.); Spanish Basin, *Rydberg & Bessey* 3798, June 28, 1897 (N. Y.); Aldridge, *Mrs. Scheuber* 110, 1901 (N. Y.); Elk Mountains, *Rydberg* 3017, 3289,

3342, 1896 (N. Y.); Long Baldy, Little Belt Mountains, *Rydberg* 3395, 3403, August 20, 1896 (N. Y.); Bridger Mountains, *Rydberg* & *Bessey* 3793, June 14, 1897 (N. Y.); Little Belt Pass, *Rydberg* 3340, August 11, 1896 (N. Y.); Midvale, *Umbach* 364, July 13, 1903 (K. M.).

IDAHO: Victor, *Merrill* & *Wilcox* 890, July 10, 1901 (N. Y.); Beaver Cañon, *Shear* 293 in part, June 26, 1895 (N. Y.).

WYOMING: Big Horn Mountains, *Tweedy* 2237, July, 1899 (N. Y.); Cliff Creek, *Curtis*, August, 1900 (N. Y.); Soda Butte Creek, *A. & E. Nelson* 5869, July 14, 1899 (N. Y.); Green Top, *Nelson* 3255, June 29, 1897 (N. Y.); Medicine Bow Range, *Kemp*, June, 1902 (N. Y.); Big Horn Mountains, *Tweedy* 2238, August, 1899 (N. Y.); Chug Creek, Albany County, *Nelson* 7336, June 29, 1900 (N. Y.); Pole Creek, Albany County, *Nelson* 1926, June 13, 1896 (N. Y.); Encampment, Carbon County, *Tweedy* 4318, 4323, July 12, 1901 (N. Y.); Centennial Valley, Albany County, *A. Nelson* 3275, July 2, 1897 (N. Y., K. M.); Battle Lake, *A. Nelson* 4012, August 16, 1897 (N. Y., K. M.); Indian Grove Mountains, *E. Nelson* 4899, July 18, 1898 (N. Y.); Laramie, *A. Nelson* 288, June 28, 1894 (C.); La Plata Mines, *A. Nelson* 1786, August 22, 1895 (C.); Welcome, *Williams*, July 26, 1897 (K. M.); Big Horn Mountains, *Buffum* 5012, August 1, 1892 (K. M.); Carbon County, *A. Nelson* 3996, 1897 (K. M.); Sand Creek, *Williams* 2689, July 26, 1897 (K. M.); Rattlesnake Gulch, *Williams*, July 26, 1897 (K. M.); Albany County, *A. Nelson* 3255, 1897 (K. M.); East De Lacy's Creek, *Rydberg* & *Bessey* 3791, August 10, 1897 (N. Y.); Swan Lake, *Mearns* 3302, August 16, 1902 (N. Y.); *Edith A. Ross*, July, 1890 (N. Y.).

COLORADO: La Plata Cañon, *Baker, Earle* & *Tracy* 699, July 11, 1898 (N. Y.); Dolores, *Crandall*, June 18, 1892 (N. Y.); Pass Creek, *Rydberg* & *Vreeland* 6453, June 30, 1900 (N. Y.); *State Agricultural College Distribution* 2547, July 30, 1899 (N. Y.); *Baker*, July 12, 1899 (N. Y.); Crystal Park, *Bessey*, July 23, 1894 (N. Y.); Bob Creek, *Baker, Earle* & *Tracy* 731, June 28, 1898 (N. Y.); Sangre de Christo Creek, *Rydberg* & *Vreeland* 6452, June 22, 1900 (N. Y.); West Indian Creek, *Rydberg* & *Vreeland* 6451, June 14, 1900 (N. Y.); Pagosa Peak, *Baker* 231, August, 1898 (N. Y.); Cascade Cañon, *Bessey*, July 12, 1895 (N. Y.);

Rocky Mountains, *Hall, Olney distribution* (N. Y., K. M.); Silver Plume, *Rydberg 2462*, August 24, 1895 (N. Y.); Northern Colorado, *Tweedy 4319*, July 2, 1901 (N. Y.); Glen Haven, *Johnston 724*, August 8, 1910 (N. Y.); Mt. Richtophen, *State Agricultural College distribution 2542*, August 7, 1899 (N. Y.); Mt. Carbon, *Nelson 78*, July, 1909 (N. Y.); Clear Creek, *Parry 391*, 1861 (C.); Mt. Carbon, *Eggleston 5883*, July 6, 1910, and *5924, 5904*, July 9, 1910 (K. M.); Kebler Pass, *Eggleston 6168*, August 22, 1910 (K. M.); Summit County, *Mann*, July, 1899 (K. M.); Breckenridge, *Mackenzie 158*, August, 1901 (K. M.).

UTAH: Dyer Mine, Uintah Mountains, *Goddling 1309*, July 9, 1902 (N. Y.); and *1354*, July 14, 1902 (N. Y.); Fish Lake, *Jones*, August 6, 1894 (N. Y.); Fish Lake, *Rydberg & Carlton 7520*, August 10, 1905 (N. Y.); Twin Creeks, *Rydberg & Carlton 7652*, August 8, 1905 (N. Y.); Big Cottonwood Cañon, *Rydberg 6816*, July 8, 1905 (N. Y.); Big Cottonwood Cañon, *Rydberg & Carlton 6627*, July 4, 1905 (N. Y.); Big Cottonwood Cañon, *Rydberg & Carlton 6395* in part, June 28, 1905 (N. Y.); Alta, Wahsatch Mountains, *Jones 1095*, July 29, 1879 (C.); Unionville, *Watson*, June, 1865 (C.); Cottonwood Cañon, *Watson 1235*, July, 1869 (C.).

NEVADA: Summit Lake region, *Griffiths & Morris 325*, July, 1901 (N. Y.).

NEW MEXICO: Bartlett Ranch, Colfax County, *Wooton*, September 4, 1913 (K. M.); Mogollon Mountains, *Metcalf 287*, July 20, 1903 (N. Y.); Pecos River National Forest, *Standley 4131*, July 1, 1908 (N. Y., K. M.); Santa Rita Creek, *Thurber 151*, 1851 (N. Y.); Copper Mines, *Bigelow*, as *C. Hoodii* (N. Y., C.); Santa Rita del Cobra, *Bigelow*, as *C. Douglasii* (N. Y., C.); Brazos Cañon, *Standley & Bollman 10909, 11039*, 1914 (K. M.).

CHIHUAHUA: Sierra Madre, *Pringle 1402*, November 3, 1887 (C.).

***Carex Egglestonii* sp. nov.**

In dense clumps, the culms 4.5–7.5 dm. high, stiffly erect, rather stout, aphyllopodic, light brownish at base, exceeding leaves, roughened on angles beneath head. Leaves with well-developed blades four to six to a fertile culm, on lower third, but not bunched, the overlapping sheaths conspicuously white-hyaline opposite the blades, the blades flat, 2–5 mm. wide, usually 1–2 dm. long, not long attenuate; head ovoid, 18–24 mm. long and

somewhat narrower, containing three to six closely aggregated but readily distinguishable gynaeandrous ovoid or ovoid-oblong spikes 10–14 mm. long, 6–10 mm. wide, rounded or short-pointed at apex, the lateral rounded and the terminal one short-tapering at base, the numerous perigynia appressed-ascending in many ranks with rather conspicuous tips, the staminate flowers few and inconspicuous; lowest bract short-prolonged, 6–18 mm. long, or scale-like, the others scale-like; scales ovate or ovate-lanceolate, acutish to short acuminate, chestnut brown with lighter midvein and conspicuous white-hyaline margins, narrower and markedly shorter than perigynia; perigynia olive-green or in age brownish, ovate, 6 mm. long, 3 mm. wide (widest near top of achene), thin except where distended by achene, strongly winged, slenderly nerved on both faces (nearly obsolete in age), rounded and sessile at base, abruptly contracted into a broad flat bidentate non-hyaline slightly colored beak 1.5 mm. long, winged and serrulate to the tip, the teeth strictly erect and contiguous but distinct; achenes lenticular, obovoid-oblong, thickish, substipitate, 2 mm. long, 1.25 mm. thick, short-pointed; style slender, not enlarged at base; stigmas two.

This handsome species of the western mountains is a member of the *Ovales*, and is probably most closely related to *Carex brevior* (Dewey) Mackenzie (see page 605). The type specimen is in the National Herbarium, and was collected by Mr. W. W. Eggleston (No. 6181), at Kebler Pass, Mt. Carbon, Gunnison County, Colorado, August 22, 1910.

SPECIMENS EXAMINED

COLORADO: West Mancos, *Baker, Earle & Tracy* 322, 9500 ft. alt., July 4, 1908 (N. Y.); Kebler Pass, Mt. Carbon, Gunnison County, *Eggleston* 6181, 3120 m. alt., August 22, 1910 (N., N. Y.); Ohio Peak, Gunnison County, *Eggleston* 5905 in part, 2900 m. alt., July 9, 1910 (N. Y.).

UTAH: La Sal Mountains, *Rydberg & Garrett* 8753, 8754, 9028, 9029, 9075, 9076, July, 1911 (N. Y.); Abajo Mountains, *Rydberg & Garrett* 9771, 9845, August, 1911, 2500–3700 m. alt. (N. Y.); Uintas, *Watson* 1239, 10,000 ft. alt., July, 1869 (C.).

WYOMING: La Plata Mines, *E. Nelson* 5150, August 25, 1898 (N. Y.).

Carex Lunelliana sp. nov.

Cespitose from short-creeping dark colored woody fibrillose rootstocks, the culms 3–6 dm. high, aphyllopodic, stout, 5–8 mm.

wide at base, rather stiff, sharply triangular, roughened above, equalling or exceeding leaves, light brown at base. Leaves with well-developed blades four to six to a fertile culm, on lower half, not bunched, the sheaths conspicuously septate nodulose dorsally, tardily breaking, truncate and but slightly colored or thickened at mouth, the blades light green, flat, 4-8 mm. wide, mostly 1-2 dm. long. Head ovoid or oblong-ovoid, dense, 1-3 cm. long, 8-15 mm. wide, containing six to twelve androgynous spikes, the lower only distinguishable. Lower bracts at least setaceous prolonged, usually shorter than the head. Spikes with five to fifteen ascending or at maturity spreading perigynia, the apical staminate flowers inconspicuous. Scales ovate, tawny tinged with three-nerved green center, acuminate, cuspidate or short awned, narrower and usually shorter than perigynia. Perigynia plano-convex, 4.25 mm. long, 3.5 mm. wide, the body orbicular, greenish, straw-colored, or at maturity light yellowish-brown and rather shining, nerveless ventrally, several nerved dorsally, sharply smooth-margined nearly to the round-truncate somewhat spongy base, the margins green, not raised, the body somewhat abruptly contracted into a strongly bidentate serrulate beak, one fourth its length. Achene lenticular, filling perigynium, 2 mm. long and as wide, brownish yellow, minutely apiculate, jointed with the deciduous style, the latter with much enlarged base. Stigmas two.

A fine series of specimens collected by Dr. J. Lunell of Leeds, North Dakota, has called to my attention the fact that *Carex gravida* Bailey has been made to cover two distinct species, the more northern plant on which the species was based being different from the southern one. Genuine *Carex gravida* has the perigynia nerveless on both sides or faintly nerved dorsally, the body of the perigynium is ovate and tapers into the beak, and the scales are mostly awned. The southern plant, which has been confused with *C. gravida*, has perigynia strongly nerved dorsally, the body of the perigynium is orbicular and contracted into the beak, while the scales are cuspidate rather than awned. It gives me pleasure to name this plant in honor of Dr. Lunell, who has done so much towards making the flora of North Dakota better known.

SPECIMENS EXAMINED

MISSOURI: Oak Grove, *Bush 7020*, June 2, 1913 (type in Herb. K. M., duplicate in Herb. N. Y. Bot. Garden); Greenwood, *Bush 6709*, May 20, 1912 (N. Y., K. M.); Lees Summit, *Mackenzie*,

June 6, 1897 and May 28, 1899 (K. M.); Levasy, *Bush* 1694, May 18, 1902 (N. Y., K. M.); Grain Valley, *Bush* 6984, May 24, 1913 (K. M.); St. Louis, *Glatfelter*, May 17, 1894 (K. M.); St. Louis, *Eggert*, June 14, 1893 (C.).

KANSAS: Osborne County, *Shear* 33, May 19, 1894 (N. Y.).

OKLAHOMA: Sapulpa, *Bush* 939, 945, 1005, May, 1895 (C.).

***Carex bulbostylis* sp. nov.**

Carex grisea var. *globosa* Bailey; A. Gray, Man. Ed. 6, 605 (at least in part). 1890.

Cespitose, the rootstocks short, hard, rather slender, the culms 2–3.5 dm. high, central and lateral, slender, erect or ascending, obtusely triangular, smooth or nearly so, strongly purplish tinged at base, exceeding leaves but exceeded by bracts; sterile shoots elongated. Leaves with well-developed blades four to ten to a culm, the blades flat with revolute margins 2.5–3.5 mm. long, mostly 1–2 dm. long, or up to 3 dm. on sterile shoots, the sheaths smooth or nearly so. Staminate spike apparently long-peduncled (actually nearly sessile, the uppermost pistillate spike being abortive and with short sheathing bract), 2–3 cm. long, 2.5–3.5 mm. wide, the scales obovate-oblong, whitish with green slightly excurrent midrib, reddish brown tinged. Developed pistillate spikes three or four, the lower on erect rough peduncles, the upper scarcely exsert-peduncled, three- to seven-flowered, oblong or sub-orbicular; bracts leaf-like, strongly sheathing. Scales broadly ovate, white-hyaline and reddish-brown tinged, with green midvein exserted as long cusp, the body narrower than and about half length of perigynia. Perigynia broadly obovoid, globose in cross-section, 4.5 mm. long, 2.5 mm. wide, finely many striate, green, minutely hispidulous when young, rounded at base and apex. Achenes obovoid, triangular, 3 mm. long, 2 mm. wide, yellowish, tapering to a substipitate base, minutely apiculate, jointed with conspicuously enlarged bulbous base of very short deciduous style; stigmas three, short.

The conspicuously enlarged style-base is the best technical character to separate this species from its allies, *Carex grisea* Wahl. and *Carex amphibola* Steud. The culms are strongly purplish tinged at the base, in this differing from *Carex grisea*. The short and proportionately broader perigynia also serve to distinguish it from that species, and still more so from *Carex amphibola* Steud.

SPECIMENS EXAMINED

TEXAS: Dallas, *Reverchon* 2422, April 13, 1901 (K. M.); also 2419, March 26, 1901 (K. M.); also 2423, May 2, 1901 (K. M.); also 2416A, April 16, 1901 (N. Y., K. M.); Fort Worth, *Ruth* 360, April 12, 1913 (type in Herb. K. M.); Tarrant County, *Ruth* 451, April 4, 1914 (K. M.); Austin, *Rugel* (C.).

***Carex onusta* sp. nov.**

Cespitose from short, fibrillose rootstocks, the culms aphyllopodic, 2-3.5 dm. high, stiff, but rather slender, bluntly triangular below, sharply triangular and roughened above, exceeding leaves, brownish at base. Leaves with well-developed blades three or four to a fertile culm, the sheaths tight, inconspicuously septate nodulose, cross rugulose ventrally and thickened at mouth, the blades green, flat, 2.5-3.5 mm. wide, mostly 1-2 dm. long. Head oblong or oblong-ovoid, dense, 8-13 mm. wide, 1.5-3 cm. long, containing eight to fifteen androgynous spikes, the lower only readily distinguishable. Lower bracts setaceous, shorter than head, the upper scale-like. Spikes with five to fifteen appressed or at length spreading or ascending perigynia, the apical staminate flowers usually forming a conspicuous but short cone. Scales ovate, cuspidate, hyaline, yellowish-brown tinged with green mid-vein, narrower than and about two thirds length of body of perigynia. Perigynia plano-convex, or slightly bi-convex, 3 mm. long, 1.5 mm. wide, oblong-ovate, green or in age yellowish, nerveless ventrally, obscurely few-nerved dorsally, sharply margined to the rounded non-spongy base, abruptly beaked, the beaked 0.75 mm. long, bidentate, serrulate. Achene plano-convex, filling perigynia 2.5 mm. long, 1.4 mm. wide, minutely truncately apiculate, the style short with much enlarged base. Stigmas two.

The perigynia strongly resemble those of *Carex Leavenworthii* Dewey and the scales are short, as in that species. The heads, however, are elongated, as in *Carex Muhlenbergii* Schk. The thin yellowish-brown tinged scales are peculiar and characteristic.

The type, collected by Professor Albert Ruth, No. 458, on April 24, 1914, in sandy woods in Tarrant County, Texas, is in my herbarium. These specimens are in most excellent condition.

***Carex Sheldonii* n. sp.**

Tufted, strongly stoloniferous, the stolons stout. Culms phyllopodic, 7.5 dm. high, glabrous, obtusely angled and very smooth below inflorescence, exceeding the elongated leaves,

neither colored nor fibrillose at base; leaves with well-developed blades about four to a fertile culm, on lower half, not bunched, the sheaths and surfaces of blades (especially lower) sparsely short-pubescent, the hyaline part of sheaths dark-tinged at edge, the blades flat, 5-6 mm. wide, 2-4 dm. long (or on sterile culms much longer), rough towards apex, the basal sheaths breaking and slightly filamentose; staminate spikes two or three, separate from each other and widely separate from the pistillate, the upper peduncled, the others sessile, linear, 2.5-3.5 cm. long, 3 mm. wide, the bract of lowest conspicuous, the scales oblanceolate, acute, erose but not ciliate at apex, in age straw-colored and hyaline; pistillate spikes two, widely separate, erect, sessile or short exserted-peduncled, oblong-cylindric, 2-5 cm. long, 8-10 mm. wide, the perigynia twenty-five to sixty, ascending in several to many ranks, closely packed or the lower somewhat loosely arranged; bracts leaf-like, the lower sheathing and exceeding inflorescence, the upper smaller, nearly sheathless; scales ovate-lanceolate, acuminate or cuspidate, green and strongly several-nerved in center, with margins hyaline and usually with intermediate brownish tinged zone, narrower and shorter than perigynia; perigynia lanceolate, 5-6 mm. long, about 2 mm. wide, obscurely triangular, little inflated, short pubescent, prominently about fifteen-nerved, tapering into the bidentate beak 2 mm. long (including teeth), the teeth short, less than 1 mm. long, slightly spreading; achenes triangular, oblong-obovoid, 2.25 mm. long, 1.25 mm. wide, stipitate; style slender, straight, not enlarged at base; stigmas three.

One of the most conspicuous features of the eastern *Carex trichocarpa* Muhl., with which the present species has been confused, is the bright purple coloring of the sheaths opposite the blades, especially at the mouth. In addition the sheaths are glabrous or at most hispidulous and do not normally break open and become filamentose. In the present species the sheaths entirely lack this purple coloring, are soft pubescent at least at the mouth and do not readily break open. In *Carex laeviconica* Dewey (a species with glabrous perigynium and impressed nerves) the purple coloring is also lacking, but the glabrous sheaths quickly break open and become filamentose. *Carex atherodes* Spreng. with glabrous very deeply bifurcate perigynia has soft pubescent sheaths which break open readily and are brownish or purple tinged.

SPECIMENS EXAMINED

OREGON: "Along Clark's Creek, about three miles above mouth. Altitude 3,140 ft.," *E. P. Sheldon 8854*, September 9, 1897 (type in Herb. K. M., duplicate in Herb. N. Y. Bot. Garden); Crow Creek, Wallowa County, 4,300 feet alt., *E. P. Sheldon 8428*, June 29, 1897 (N. Y., K. M.); ditch sides of Malheur River, *Cusick 2549*, June 7, 1901 (N. Y.).

IDAHO: House Creek, Owyhee County, *Nelson & Macbride 1826*, June 30, 1912.

CALIFORNIA: "Jess Valley to Blue Lake," *Griffiths & Hunter 429*, August, 1902 (N. Y.).

***Carex exserta* sp. nov.**

Carex filifolia var. γ *erostrata* Kükenth.; Engler's Pflanzenreich 4²⁰: 86. 1909. Not *Carex erostrata* Boott.

Very densely cespitose, the culms very slender and wiry, 5–25 cm. high, obtusely triangular, smooth, equalling or exceeding leaves, brownish, the basal sheaths filamentose. Leaves with well-developed blades two to four to a fertile culm, clustered above base, acicular, channelled, little roughened towards apex, 0.25–0.5 mm. wide, 1–10 cm. long, the sheaths tight, hyaline ventrally. Spike solitary, androgynous, 7–15 mm. long, the staminate part half or more length of whole, the scales reddish-brown, obovate, obtuse, minutely hyaline margined, the pistillate part up to 6 mm. wide with two to twelve ascending perigynia, the scales orbicular-ovate, obtuse, dull reddish brown with hyaline margins, exceeded by ripe perigynia. Bract scale-like or slightly developed. Perigynia obovoid, obtusely triangular, 2–5 mm., nearly 2 mm. wide, rounded at base and apex, nerveless, but obscurely two-ridged, essentially beakless, papillose-puberulent, brownish tinged, hyaline and obliquely cut at mouth. Achenes triangular, obovoid, closely filling perigynia, sessile brownish, 2 mm. long, apiculate, jointed with the very short, black exserted style. Stigmas three. Racheola conspicuous.

This characteristic Californian species differs constantly from the more eastern and northern *Carex filifolia* Nutt. in the essentially beakless perigynia and the duller colored scales. The style although very short is exserted, black and conspicuous.

The following specimens have been examined, all from the Sierra Nevada of California, at elevations between 1,500 and 3,500 meters:

summit of Morro Pass, *Brewer 1733*, June 27, 1863 (Cal.); Soda Springs of Tuolumne, *Brewer 1697*, June 26, 1863 (Cal.); Black Mountain, Fresno County, *Hall & Chandler 616*, July, 1900 (Cal.); Ebbett's Pass, *Brewer 2029*, August 3, 1863 (Cal.); Big Trees, *Hillebrand 2318* (Cal.); Echo Lake, El Dorado County, *Brainerd*, July 11, 1897 (Cal.); Mt. Lyell, *Hall & Babcock 3581*, July, 1902 (Cal.); Kings River, *Lemmon*, July, 1902 (Cal.); Yosemite, *Abrams 4600*, July, 1911 (K. M.); Little Yosemite, *Jepson 4396*, July 11, 1911 (K. M.); Harrison Pass, *Jepson 5035*, July 16, 1912 (K. M.); Cold Creek, Yosemite, *Jepson 4493*, July 22, 1911 (K. M.).

***Carex rugosperma* sp. nov.**

"*Carex umbellata* Schkuhr," Mackenzie, Bull. Torrey Club **40**: 551. 1913.

A careful study of Schkuhr's plate of *Carex umbellata* has thoroughly convinced me that what he had was the plant with short-beaked perigynia, named *Carex abdita* by Mr. Bicknell.* The plant with the long-beaked perigynia is in consequence without a name. A specimen collected by me at Tuckerton, New Jersey, in May, 1911, and in my herbarium, may be designated as the type of the above species.

* Bull. Torrey Club **35**: 492. 1908.